

IN THE CLAIMS

This listing of claims replaces all prior versions and listing of claims in the application:

1. (currently amended) A balloon catheter for performing an angioplasty procedure on a lesion in a vessel comprising a flexible elongate catheter shaft having proximal and distal extremities, a balloon secured to the distal extremity of the catheter shaft and having proximal and distal extremities and having an interior and an inflatable portion movable between deflated and inflated conditions, the catheter shaft having a balloon inflation lumen extending from the proximal extremity to the distal extremity of the catheter shaft and opening into the interior of the balloon, a fitting for supplying an inflation medium to the inflation lumen for causing movement of the inflatable portion of the balloon from the deflated condition to the inflated condition, ~~said the inflatable portion of the~~ the inflatable portion of the balloon having an outer surface extending from the proximal extremity to the distal extremity of the balloon which moves outwardly radially upon inflation of the balloon and at least one flexible elongate element extending over the outer surface of the balloon from the proximal extremity to the distal extremity of the balloon, said flexible elongate element having a proximal and distal extremities fixed longitudinally relative to the catheter shaft at respective positions proximally and distally of the outer surface of the balloon extremity coupled to the catheter shaft proximal of the inflatable portion of the balloon and a distal extremity, an elastic member coupling the distal extremity of the flexible elongate element to the catheter shaft distal of the inflatable portion of the balloon for permitting the flexible elongate element to move radially outward as the balloon is inflated whereby expansion of the balloon causes movement of the flexible elongate element into engagement with the lesion to form a longitudinal channel in the lesion.

2. (previously presented) A balloon catheter as in Claim 1 wherein a plurality of flexible elongate elements are provided which are spaced apart circumferentially of the balloon.

Claims 3-4. (cancelled)

5. (currently amended) A balloon catheter as in Claim 1 wherein ~~at least one of the proximal and distal extremities of the flexible elongate element~~ the elastic member is formed of an elastic material to permit stretching outward radial movement of the flexible elongate element during inflation of the balloon ~~and retraction during deflation of the balloon.~~

Claim 6. (cancelled)

7. (original) A balloon catheter as in Claim 1 wherein said balloon when in a deflated condition is folded over the flexible elongate element to prevent injury to the vessel during delivery of the balloon to the lesion in the vessel.

8. (original) A balloon catheter as in Claim 1 wherein said flexible elongate element is substantially circular in cross section.

9. (original) A balloon catheter as in Claim 1 wherein said flexible elongate element is substantially triangular in cross section.

10. (original) A balloon catheter as in Claim 9 wherein said outer surface of the balloon in the inflated condition in cross section has a curved surface and wherein said flexible elongate element which is triangular in cross section has a surface in cross section which is concave to accommodate the curved outer surface of the inflated balloon and to provide a better fit between the balloon and the flexible elongate element as the balloon is expanded to bring the flexible elongate element into engagement with the lesion in the vessel.

11. (original) A balloon catheter as in Claim 9 wherein said flexible elongate element has a longitudinal axis and has longitudinally spaced apart cutouts therein to increase the flexibility of the flexible elongate elements along the longitudinal axes.

12. (previously presented) A balloon catheter as in Claim 11 wherein filler material is disposed in the cutouts.

13. (previously presented) A balloon catheter as in Claim 12 wherein said filler is a relatively soft material selected from a group consisting of an adhesive and a polymer.

14. (previously presented) A balloon catheter as in Claim 1 wherein said flexible elongate element is formed of a rigid flexible material selected from a group consisting of stainless steel, Nitinol, Nylon, fluoropolymer and carbon fiber.

Claims 15-19. (cancelled)

20. (previously presented) A balloon catheter as in Claim 1 wherein the flexible elongate element is detached from the outer surface of the balloon.

21. (previously presented) A balloon catheter for use with an inflation medium to perform an angioplasty procedure on a lesion in a vessel comprising a flexible elongate catheter shaft having proximal and distal extremities, a balloon secured to the distal extremity of the catheter shaft and having an inflatable portion provided with an interior, the catheter shaft having a balloon inflation lumen extending from the proximal extremity to the distal extremity and opening into the interior of the balloon adapted to supply the inflation medium to the interior so as to permit inflation of the balloon, and at least one flexible elongate element secured to the catheter shaft proximal and distal of the inflatable portion so as to extend longitudinally over the inflatable portion of the balloon and be in longitudinal tension over the inflatable portion of the balloon whereby upon inflation of the balloon the flexible elongate element is moved into engagement with the lesion to form a longitudinal channel in the lesion.

22. (previously presented) A balloon catheter as in Claim 21 wherein a plurality of flexible elongate elements are provided which are spaced apart circumferentially of the balloon.

23. (previously presented) A balloon catheter as in Claim 21 wherein the flexible elongate element has proximal and distal extremities, at least one of the proximal and distal extremities of the flexible elongate element being formed of an elastic material to permit stretching of the flexible elongate element during inflation of the balloon.

24. (previously presented) A balloon catheter as in Claim 23 wherein both of the proximal and distal extremities of the flexible elongate element are formed of an elastic material.

25. (previously presented) A balloon catheter for use with an inflation medium to perform an angioplasty procedure on a lesion in a vessel comprising a flexible elongate catheter shaft having proximal and distal extremities, a balloon secured to the distal extremity of the catheter shaft and having an inflatable portion provided with an interior, the catheter shaft having a balloon inflation lumen extending from the proximal extremity to the distal extremity and opening into the interior of the balloon adapted to supply the inflation medium to the interior so as to permit inflation of the balloon, and at least one flexible elongate element having a proximal extremity secured to the catheter shaft proximal of the inflatable portion and a distal extremity secured to the catheter shaft distal of the inflatable portion whereby upon inflation of the balloon the flexible elongate element is moved into engagement with the lesion to form a longitudinal

channel in the lesion, at least one of the proximal and distal extremities of the flexible elongate element being formed of an elastic material to permit stretching of the flexible elongate element during inflation of the balloon.

26. (previously presented) A balloon catheter as in Claim 25 wherein both of the proximal and distal extremities of the flexible elongate element are formed of an elastic material.

27. (previously presented) A balloon catheter as in Claim 25 wherein a plurality of flexible elongate elements are provided which are spaced apart circumferentially of the balloon.

Claims 28-29. (cancelled)

30. (currently amended) A balloon catheter for performing medical procedure on a lesion in a vessel comprising: a flexible elongate catheter shaft having proximal and distal extremities; a balloon secured to the distal extremity of the catheter shaft and having an inflatable portion provided with an interior; the catheter shaft having a balloon inflation lumen extending from the proximal extremity to the distal extremity and opening into the interior of the balloon ~~and adapted to supply the~~ for supplying an inflation medium to the balloon interior of the balloon so as to ~~permit~~ cause the inflation portion of the balloon; to move radially outward and at least one flexible elongate element ~~detached from and extending over the inflatable portion of the balloon and having first and second extremities, said at least one~~ the first extremity of the flexible elongate member being coupled to the catheter shaft, an elastic member for securing of the second extremity of the flexible elongate member secured to the catheter shaft proximal and distal of the inflatable portion for permitting the flexible elongate member to move radially outward as the balloon is inflated.

31. (previously presented) The balloon catheter of Claim 30 wherein upon inflation of the balloon the flexible elongate element is moved into engagement with the lesion.

32. (new) The balloon catheter of Claim 30 wherein the balloon has first and second end portions, the first extremity of the flexible elongate member being coupled to the catheter shaft in the vicinity of the first end portion of the balloon and the elastic member securing the second extremity of the flexible elongate member to the catheter shaft in the vicinity of the second end portion of the balloon.

33. (new) The balloon catheter of Claim 30 wherein the elastic member secures the second extremity of the flexible elongate member to the catheter shaft distal of the inflation portion of the balloon.

34. (new) The balloon catheter of Claim 30 wherein the elastic member secures the second extremity of the flexible elongate member to the catheter shaft proximal of the inflation portion of the balloon.

35. (new) The balloon catheter of Claim 30 wherein the elastic member is a coil spring.